in heart failure patients treated with either ultrafiltration or diuretics to achieve equivalent fluid removal, sustained hemodynamic and neurohormonal benefit occurred only in the ultrafiltration group. Compared with the diuretic group, patients treated with ultrafiltration had lower norepinephrine, plasma renin, and aldosterone levels for up to 90 days. Lower RAAS activation was associated with sustained improvement in objective measures of functional capacity. The rate of 14 to 15 ml/min for interstitial fluid mobilization was outlined still earlier by Fauchald and Fauchald (4), as recently reviewed by Schrier (5).

The conclusions of Rogers et al. (6) about the impact of diuretics and ultrafiltration on renal function might or might not be verified in larger trials. However, we feel strongly that the important outcomes in subsequent studies involving patients hospitalized with heart failure remain focused on a reduction of cardiovascular mortality and heart failure rehospitalizations, rather than on the more specific end point of renal function. This is where we propose that new tactics are needed.

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Is it Myocarditis or Arrhythmogenic Right Ventricular Cardiomyopathy?

Pieroni et al. (1) conclude that right ventricular myocarditis frequently mimics arrhythmogenic right ventricular cardiomyopathy (ARVC), and 3-dimensional electroanatomic mapping (guided endomyocardial biopsy is a tool that can differentiate the 2 entities, guiding appropriate therapy. The gist of their message suggests that these 2 entities are mutually exclusive, and in their cohort, electrocardiographic abnormalities, arrhythmias, right ventricular structural and functional abnormalities, Task Force criteria fulfillment, a 3-dimensional voltage map, and inducible arrhythmias on electrophysiologic testing could not separate the wheat from the chaff. Some experts have suggested that a "hot phase" may interpolate periods of clinical quiescence, and the former may present as myocarditis or worsening ventricular arrhythmia (2). If we were to acknowledge the possibility of this alternative hypothesis, the findings may be interpreted differently. The 15 patients who were diagnosed with myocarditis may represent a hot phase, and although they did not have fibrofatty changes, they fulfilled Task Force criteria, which are quite specific for the diagnosis of the disease. These patients with myocarditis may represent an earlier phase of the disease, and the observation that none of these patients experienced arrhythmic events gives credence to this possibility. Genetic testing in this sample would have been highly desirable even though it is not considered necessary for diagnosis by the authors. We agree with the authors that a revision and reappraisal of diagnostic criteria for ARVC is long overdue.

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Myocarditis Mimicking Arrhythmogenic Right Ventricular Cardiomyopathy

We have read with interest the paper by Pieroni et al. (1) addressing myocarditis as a common differential diagnosis to arrhythmogenic right ventricular cardiomyopathy (ARVC). Among 30 patients noninvasively fulfilling Task Force criteria (2) for ARVC, they found that 15 patients actually had myocarditis based on 3-dimensional electroanatomic voltage mapping-guided endomyocardial biopsy. Voltage-guided biopsy is an elegant way of obtaining histological material from areas of the right ventricle with electrical signs of regional abnormalities and may facilitate the diagnostic workup. However, we have the following questions/concerns about the study by Pieroni et al. (1):

1. Myocardial inflammation. Numerous previous reports document myocardial inflammation as a frequent finding (up to 80% of patients) in ARVC (3,4). The authors report, surprisingly, that none of their ARVC patients had accompanying inflammation. Furthermore, the results are not consistent with a recent report from another Italian group investigating autopsy material and explanted hearts in geno-positive ARVC patients (5). That study showed accompanying inflammatory infiltrations in 10 of 10 patients and no evidence of an infective etiopathogenesis (5). Have the authors considered the possibility that the inflammatory infiltrations seen in the "myocarditis" group are part of the ARVC phenotype and that fibrofatty replacements may occur later in the course of the disease? This possible difference in disease development may also explain the benign course seen in the group in the relatively short follow-up period.
2. Viral genome in the myocardium. Five of the 15 patients classified as having myocarditis had the presence of viral genome (parvo B19 virus in 3 cases, influenza virus in 2 cases) in the myocardium documented by PCR. Different viruses may persist in asymptomatic individuals without being pathogenic. A recent report from Italy showed 12 of 19 asymptomatic individuals had detectable parvo B19 deoxyribonucleic acid in their myocardium (6). In addition, ARVC patients may have increased susceptibility of having myocarditis as a secondary phenomenon.
3. Molecular genetics. No mutation screening of desmosomal genes was performed. Given the lack of reference diagnostic modality for ARVC, the frequency of desmosomal mutations in both groups is highly relevant. A positive molecular genetics finding in the "myocarditis" group would reclassify the patient into the "ARVC" group.

Based on the abovementioned observations, the results presented by Pieroni et al. (1) should be confirmed in larger ARVC cohorts with supplementary desmosomal mutation screening.

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Diagnosis of Myocarditis Mimicking Arrhythmogenic Right Ventricular Cardiomyopathy

The Role of Endomyocardial Biopsy Guided by Electroanatomic Voltage Map

Pieroni et al. (1) recently reported a 50% prevalence of right ventricular (RV) myocarditis in a cohort of 30 patients fulfilling standardized diagnostic criteria for arrhythmogenic right ventricular cardiomyopathy (ARVC). The differential diagnosis between myocarditis and ARVC was obtained by performing electroanatomic mapping of the RV and then focusing, "for the first time," an endomyocardial biopsy (EMB) on selected pathological areas characterized by low-voltage potentials (electroanatomic mapping-guided EMB). Adopting this "novel diagnostic technique," Pieroni et al. (1) significantly modified the initial ARVC diagnosis.

We would like to make some comments regarding this study and its results. First, to the best of our knowledge, this is not the first report describing the electroanatomic mapping-guided EMB since this "novel diagnostic technique" has already been exhaustively described by our group (2,3). In particular, in 2008, we published the first report (3) documenting the feasibility of RV voltage mapping-guided EMB in a series of 16 consecutive patients with clinical evidence or suspicion for ARVC.

Second, contrary to the findings reported by Pieroni et al. (1), in our study (3), we did not observe histological evidence of myocarditis in any of the 16 patients with clinical evidence or suspicion for ARVC, in whom a pathological RV voltage map was documented. Up to now, we have been performing EMB targeting RV low-voltage areas in more than 40 patients with clinical evidence or suspicion for ARVC, and we have never observed evidence of active or borderline myocarditis according to the Dallas criteria. Our findings, in agreement with the observations of Corrado et al. (4), seem logical: since myocarditis usually has a patchy distribution in the heart chambers, it is unlikely to produce solid transmural scars detectable as low-voltage areas with endocardial electroanatomic mapping.

Third, in the study of Pieroni et al. (1), the most frequently involved RV regions (Table 2 of their study), in descending order, were the outflow tract (77%), the anterior free wall (50%), and the posteroinferior wall (43%), whereas the RV apex and the septal wall were less frequently involved (13% and 3%, respectively). Coherently, the authors included in the article 2 RV voltage maps, obtained from representative patients with ARVC (Fig. 2D of their study) and myocarditis (Fig. 3D of their study), both showing